# NOVA GEOPHYSICAL SERVICES

SUBSURFACE MAPPING SOLUTIONS
56-01 Marathon Parkway, P.O. Box 765, Douglaston, New York 11362
Ph. 347-556-7787 Fax. 718-261-1527
www.nova-gsi.com


October 8, 2012

Lynette B. Mokry, PG, CHMM
EA Science and Technology
6712 Brooklawn Parkway, Suite 104
Syracuse, New York 13211
(315)431.4610 - Office
(315)430.1786 - Cell
lmokry@eaest.com

Re: Geophysical Survey Report
Commercial Property
2960 S. Park Ave.
Lackawanna, NY

Dear Ms. Mokry:

Nova Geophysical Services (NOVA) is pleased to provide findings of our geophysical survey at the above referenced project site located at 2960 S. Park Ave., Lackawanna, NY (the "Site"). Please see attached Geophysical Survey map for more details.

**INTRODUCTION TO GEOPHYSICAL SURVEY**

NOVA performed a Geophysical survey consisting of Ground Penetrating Radar (GPR), Electromagnetic (EM) surveys and comprehensive subsurface utility (CSUL) surveys at the project Site. The purpose of this survey is to clear and mark proposed boring locations, identify any underground storage tanks (USTs), anomalies, subsurface structures and utilities that maybe located at the vicinity of the proposed boring locations at the project site on October 4th, 2012.

The equipment selected for this investigation will be included a CSUL Pipe and Cable Locator (an magnetic detector), Electromagnetic detector (EM & Fisher TW-6), and NOGGIN's 250 MHz ground-penetrating radar (GPR) unit.

A GPR system consists of a radar control unit, control cable and a transducer (antenna). The control unit transmits a trigger pulse at a normal repetition rate of 250 MHz. The trigger pulse is sent to the transmitter electronics in the transducer via the control cable. The transmitter electronics amplify the trigger pulses into bipolar pulses that are radiated to the surface. The

transformed pulses vary in shape and frequency according to the transducer used. In the subsurface, variations of the signal occur at boundaries where there is a dielectric contrast (void, steel, soil type, etc.). Signal reflections travel back to the control unit and are represented as color graphic images for interpolation.

## GEOPHYSICAL METHODS

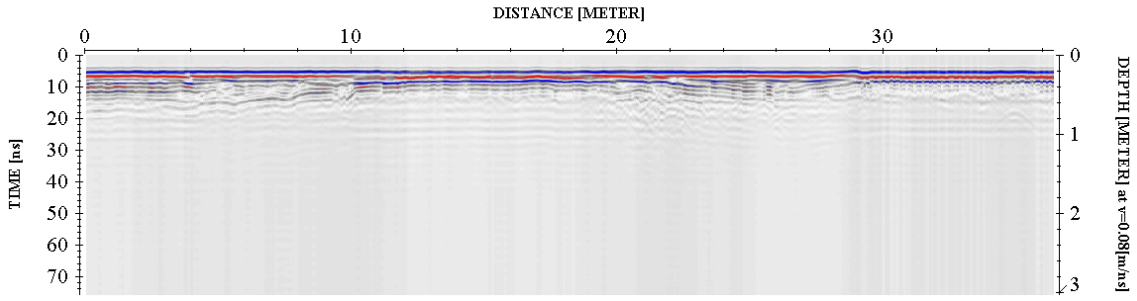
The project site was first screened using the Geonics(tm) electromagnetic detector by carrying the instrument over the boring locations at the site in 5' x 5' traverses. When evidence of anomalies were observed, the Ditch-witch(tm) utility locator was then used to determine if the anomalies were utilities or other large sub-surface metal objects. Finally, GPR profiles were collected over each metal-detector anomaly and inspected for reflections, which could be indicative of USTs.

GPR data profiles were collected for the areas of the Site specified by the client. The whole surveyed areas at the Site lies on unconsolidated soils, with significant amount of fill materials, that acted as “geophysical noise” and causes diffraction patterns not associated with subsurface structures. Despite the problems, we feel that the geophysical study was successful in reconstructing the subsurface and identified subsurface anomalies.

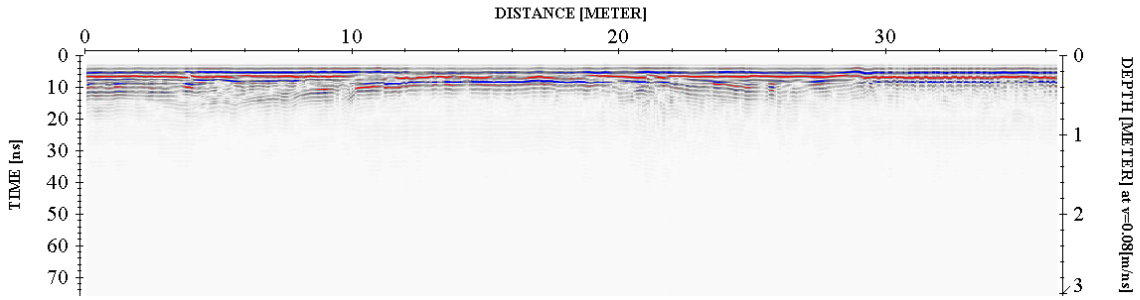
## DATA PROCESSING

In order to improve the quality of the results and to better identify subsurface anomalies, NOVA processed the collected data. The processes flow is briefly described at this section.

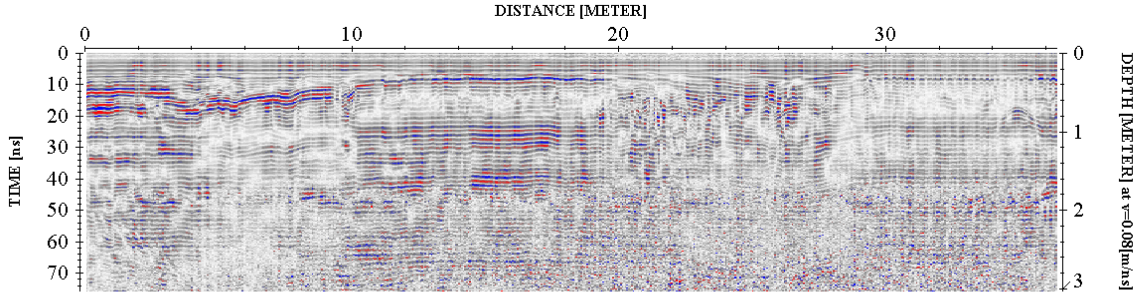
**Step 1.** Import raw RAMAC data to standard processing format



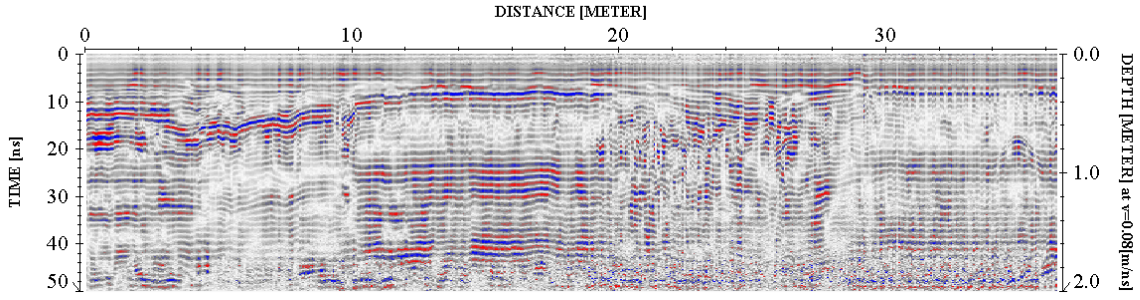

**Step 2.** Remove instrument noise *(dewow)*



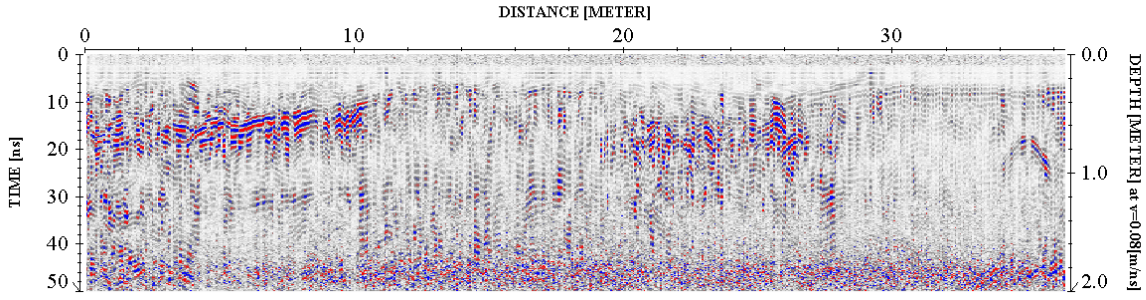

**Step 3.** Correct for attenuation losses *(energy decay function)*




**Step 4.** Remove static from bottom of profile *(time cut)*




**Step 5.** Mute horizontal ringing/noise *(subtracting average)*



The above example shows the significance of data processing. The end image (step 5) has higher resolution than the starting image (raw data – step 1) and more describes the subsurface anomalies more accurately.

**PHYSICAL SETTINGS**

Nova observed following physical conditions at the time of the survey:

**The weather**: Mostly cloudy and light rain
**Temp:** 75 degrees

**Surface:** Paved (asphalt and concrete) and none paved areas.

**Geophysical Noise Level (GNL):** Geophysical Noise Level (GNL) was medium due to general sediments settings (fill materials) located throughout of the project site.

**RESULTS**

The results of the geophysical survey identified following anomalies located at the project Site:

- Nova's Geophysical survey confirmed that the site contained unconsolidated fill materials with bricks, stones, large concrete blocks, metals and etc. Therefore, NOVA's EM survey did not yield any usable data.

- Geophysical survey identified subsurface anomalies consistent with the former and current utility lines (gas & storm drain lines) located throughout of the project site.

- Geophysical survey identified scattered anomalies located throughout of the surveyed areas. Based on their reflections and proximity none of these anomalies were consistent with any USTs.

- Nova cleared and marked proposed monitoring well area (MW-5) located at the project site. Additionally, due to excessive subsurface findings (subsurface structures consistant with storm drain lines, etc.) at this area, an alternate area was cleared and marked along the eastern side of the originally surveyed area. All of the identified anomalies (subsurface storm/sewer lines) were clearly marked and stated during the survey. No other significant anomalies were identified.

- NOVA cleared and marked all of the proposed boring locations at the project area.

- Geophysical Survey Plan portrays the areas investigated during the geophysical survey.

If you have any questions please do not hesitate to contact the undersigned.
Sincerely,

**NOVA Geophysical Services**

Levent Eskicakit, P.G., E.P.
Project Engineer

## Attachments:

Figure 1 Site Location Map
Geophysical Survey Plan
Geophysical Images

**F:\Documents\LECE\EM\Reports\Geophysical Survey Report, 2960 S. Park Avenue, Lackawanna, NY doc**


# FIGURE 1
## SITE LOCATION MAP


**NOVA**
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**Subsurface Mapping Solutions**
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(718) 261-1527 Fax (718) 261-1528
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**SITE:** **Commercial Property**
2960 S. Park Ave., Lackawanna, NY

**SCALE:** See Map



**NOVA**

**Geophysical Engineering Services**

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# GEOPHYSICAL SURVEY SITE PLAN

**SITE:** 2960 S. Park Ave., Lackawanna, NY
**CLIENT:** **EA Science and Technology**
**SCALE:** Not To Scale
**DATE** : 10/03/12

## INFORMATION

- GPR / EM Surveyed Area
- Scattered/ Anomaly
- Major Anomaly
- Underground Piping (Sewer, Electric, and gas)
- Boring Location

**GEOPHYSICAL IMAGES**
**Commercial Property**
2960 S. Park Ave., Lackawanna, NY
October 4, 2012




**GEOPHYSICAL IMAGES**
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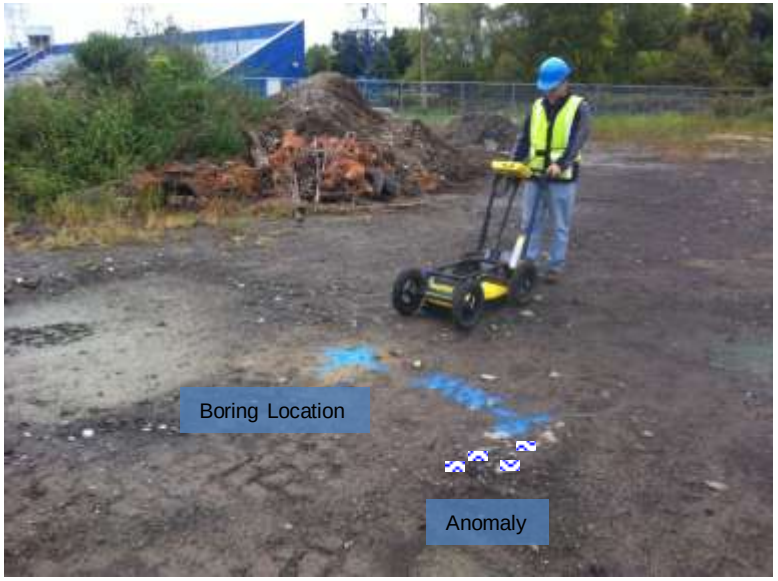
2960 S. Park Ave., Lackawanna, NY
October 4, 2012






**GEOPHYSICAL IMAGES**
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## GEOPHYSICAL IMAGES

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April 23, 2013

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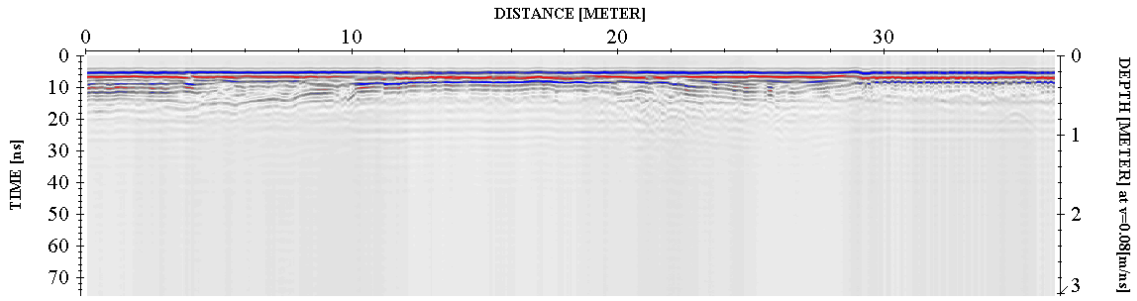


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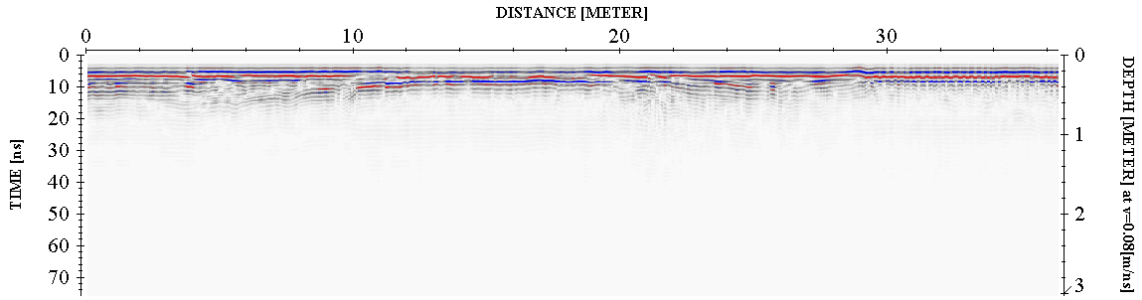


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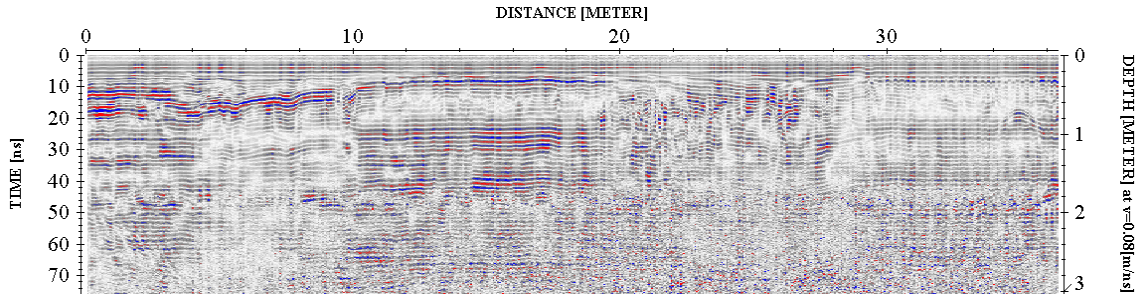


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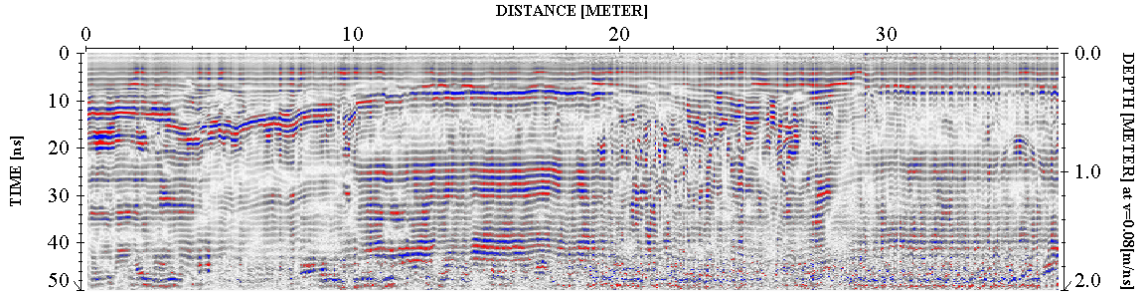


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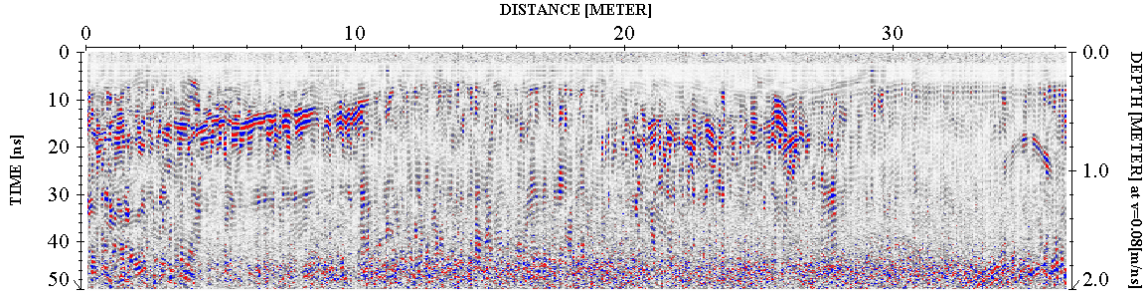

The above example shows the significance of data processing. The end image (step 5) has higher resolution than the starting image (raw data – step 1) and more describes the subsurface anomalies more accurately.

## PHYSICAL SETTINGS

Nova observed following physical conditions at the time of the survey:

**The weather**: Mostly cloudy and light rain
**Temp:** 35 degrees

**Surface:** None paved areas.

**Geophysical Noise Level (GNL):** Geophysical Noise Level (GNL) was low to medium due to general sediments settings (fill materials) located throughout of the project site.

## RESULTS

The results of the geophysical survey identified following anomalies located at the project Site:

- Nova's Geophysical survey confirmed that the site contained unconsolidated fill materials with bricks, stones, large concrete blocks, metals and etc. Therefore, NOVA's EM survey did not yield any usable data.

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# FIGURE 1
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# GEOPHYSICAL SURVEY SITE PLAN

SITE: Lackawanna Incinerator, Lackawanna, NY
CLIENT: EA Science and Technology
SCALE: See Map
DATE : 04/12/13

## INFORMATION

- GPR / EM Surveyed Area
- Scattered/ Anomaly
- Major Anomaly
- Underground Piping (Sewer, Electric, and gas)
- Proposed Boring Location

**Lackawanna Incinerator**

2960 South Park Avenue, Lackawanna, NY

April 12, 2013

**GEOPHYSICAL IMAGES**

**Lackawanna Incinerator**

2960 South Park Avenue, Lackawanna, NY

April 12, 2013

**Lackawanna Incinerator**

2960 South Park Avenue, Lackawanna, NY

April 12, 2013